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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,517	11/14/2006	Jong Chul Ye	US030089	2069

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EXAMINER
KIM, HEE-YONG

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,517	YE, JONG CHUL	
	Examiner	Art Unit	
	HEE-YONG KIM	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 May 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/24/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because there are no labels in Fig.1-3 for rectangular boxes. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. **Claim 1** is objected to because of the following informalities: claim 1 recites "a first ration". The examiner maintains that "ration" is typographical error and it should be "ratio". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 1-24** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding **claim 1**, the claim recites "determining a ratio $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$; where a $D_i(R; \theta)$ represents a distortion model for an i-th block, $R_i(k)$ represents a rate for a k-(run, level) pair, and $\theta_i(k)$represents an estimated parameter for the i-th block using a k-(rtm, level) pair, and if $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$ is less than λ or if $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$ is a first ratio that is not less than λ, putting the k-th (run, length) pair into a base layer, otherwise if $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$ is greater than λ, putting the k-th (run, length) pair into an enhancement layer,". With respect the claim, the specification describes the parametric model $D(R; \theta)= \sigma^2 \exp(-\alpha R)$ where $\theta =(\sigma , \alpha)$, and $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$ is derived from this (page 11, line 22-23). Also, the specification recites "Estimate $\theta_i(k)$ using $\{C_i(m)\}$ and $\{L_i(m\}$ and update the parametric distortion $D_i(R_i(k); \theta_i(k))$" (pp.12, line 14-15). However, there is no disclosure how to estimate $\theta_i(k)$ using $\{C_i(m)\}$ and $\{L_i(m\}$

and update the parametric distortion $D_i(R_i(k); \theta_i(k))$. Furthermore, there is no disclosure in the specification "or if $|\partial D_i(R_i(k); \theta_i(k)) / \partial R_i(k)|$ is a first ratio that is not less than λ, putting the k-th (run, length) pair into a base layer".

Regarding other independent claims **13** and **24**, they are decoders and have same issues as encoder (claim 1). Therefore, they are rejected too.

Regarding other remaining claims, they are dependent on any of the above independent claims. Therefore, they are rejected too.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1-26** are rejected as being unpatentable over Ye (US 7.010) (hereafter referenced as Ye) and in view of Zhang (Proc. SPIE, vol.4671, Visual Communications and Image Processing 2002, pp.817-827), hereafter referenced as Zhang.

Regarding **claim 1**, Ye discloses System and Method for Rate-Distortion Optimized Data Partition for Video Coding Using Backward Adaptation. Ye specifically discloses A method for partitioning data for a scalable video encoder (Fig.1), the method comprising the steps of:

receiving video data (Input Video, Fig.1);

Determining DCT coefficients (8x8 DCT coefficients, col.5, line 43-46) for a plurality of

macroblocks (macroblock, col.5, line 47) of a video frame;

quantizing the DCT coefficients (quantized coefficients, col.5, line 30);

converting the quantized DCT coefficients into (run, length) pairs (rum-level pairs, col.5, line 39-40); and

for each the plurality of macroblocks in the video frame, determining a ratio $|\partial D_i / \partial R_i|$ (Equation 3, $\partial D_i / \partial R_i = \{ |X_i^k|^2 / L_k \}$, where D_i represents a distortion model for an i-th block (Distortion from i-th block, col.6, line 10-12), R_i represents a rate for an i-th block (Rate from i-th block, col.6, line 10-12); and

if $|\partial D_i / \partial R_i|$ is less than λor if $|\partial D_i / \partial R_i|$ is a first ratio that is not less than λ, putting the k-th (run, length) pair into a base layer (Col.6, line 60-66),

otherwise if $|\partial D_i / \partial R_i|$ is greater than λ, putting the k-th (run, length) pair into an enhancement layer (Col.7, line 3-5), where λ is determined in accordance with a Lagrangian calculation (Lagrangian λ is determined by the standard bisection search, col.6, line 23-24).

However Ye fails to disclose that where $D_i = D_i(R; \theta)$ represents a distortion model for an i-th block (Distortion from i-th block, col.6, line 10-12), $R_i(k)$ represents a rate for a k-(run, level) pair (Rate from i-th block, col.6, line 10-12), and θ_i (k)represents an estimated parameter for the i-th block using a k-(rum, level) pair,

In the analogous field of endeavor, Zhang discloses Constant Quality Constrained Rate Allocation for FGS Video Coded Bitstreams. Zhang specifically discloses a piecewise exponential R-D model, $D = \sigma^2 \exp(-\alpha R)$ in order to approximate

the actual characteristic of Rate-Distortion (pp. 821, line 3-4). It means that $D_i = D_i(R; \theta)$ for each macroblock, where $\theta = (\sigma, \alpha)$.

Therefore, given this teaching, it would have been obvious to one skilled in the art to modify Ye by providing specifically the piecewise exponential R-D model and updating R-D model ($\theta_i(k)$, $R_i(k)$, and $D_i(R_i(k); \theta_i(k))$ based on inclusion of each (run-length) pair, in order to approximate the actual characteristic of Rate-Distortion. The Ye method, incorporating the piecewise exponential R-D model and updating R-D model ($\theta_i(k)$, $R_i(k)$, and $D_i(R_i(k); \theta_i(k))$ based on inclusion of each (run-length) pair, has all the features of claim 1.

Regarding **claim 2**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses further comprising the step of transmitting the base (base layer, fig.1) and enhancement layers (enhancement layer, Fig.1) over different transmission channels (plurality of channels, col.4, line 56).

Regarding **claim 3**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein scalable video encoder (scalable video coding, col.1, line 16) is MPEG-4 Encoder (MPEG 4, col.1, line 29).

Regarding **claim 4**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein scalable video encoder (scalable video coding, col.1, line 16) is H.263 Encoder (H.263, col.2, line 23).

Regarding **claim 5**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein scalable video encoder (scalable video coding, col.1, line 16) is MPEG-2 Encoder (MPEG 2, col.1, line 29).

Regarding **claim 6**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein scalable video encoder is a video encoder which has DCT transform (Discrete Cosine Transform, col.2, line 10) and entropy coding (entropy coding, col.5, line 29-30).

Regarding **claim 7**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein scalable video encoder is realized by transcoding single layer MPEG2, MPEG4, and H.26L (transcoding single layer MPEG2, MPEG4, and H.26L, col.9, line 65-67).

Regarding **claim 8**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses further comprising the step of quantizing λ(λcan be quantized, col.7, line 54) and transmitting (transmitting λ, col.7, line 61) the quantized value as side information to a decoder.

Regarding **claim 9**, Ye and Zhang disclose everything claimed as applied above (see claim 6). In addition, Ye discloses wherein the side information is sent only once in a flame header for the video frame (only once at the video frame header, col.7, line 52-56).

Regarding **claim 10**, Ye and Zhang disclose everything claimed as applied above (see claim 6). In addition, Ye discloses wherein the side information can be sent to a slice header or a video packet header to improve robustness. (slice or video packet level to combat frame header loss, col.7, line 57-60).

Regarding **claim 11**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein λ is determined to meet

a rate budge for a transmission channel for the base layer using a bisection algorithm (λ is determined by the standard bisection search so that the rate constraint is satisfied, col.6, line 23-24).

Regarding **claim 12**, Ye and Zhang disclose everything claimed as applied above (see claim 1). In addition, Ye discloses wherein λ is determined to meet a rate budge for a transmission channel for the base layer using an adaptive algorithm (meet a rate budget for a transmission channel for the base layer using an adaptive algorithm, col.10, line 18-20).

Regarding **claim 13**, the Ye method, incorporating the piecewise exponential R-D model and updating R-D model (θ_i (k), $R_i(k)$, and $D_i(R_i(k); \theta_i(k))$ based on inclusion of each (run-length) pair, as applied to claim 1, discloses A method for determining a boundary between a base layer and at least one enhancement layer in a scalable video decoder (Ye: Fig.1), the method comprising the steps of:

receiving the base layer and the at least one enhancement layer (Fig.1), the base layer (Ye: base layer in the decoder, Fig.1) and enhancement layer (Ye: enhancement layer in the decoder, Fig.1) including data representing (run, length) pairs (Ye: (run, length) pairs, col.7, line 17) for a plurality of macroblocks in a video frame;

for each the plurality of macroblocks in the video frame, determining a ratio $|\partial D_i(R_i) / \partial R_i|$ (Ye: Equation 3, $\partial D_i / \partial R_i = \{ |X_i^k|^2/L_k\})$;

where a $D_i(R; \theta)$ represents a distortion model for an i-th block, $R_i(k)$ represents a rate for a k-(run, level) pair (Ye: Rate from i-th block, col.6, line 10-12), and θ_i (k)represents an estimated parameter for the i-th block using a k-(rum,

level) pair (incorporating the piecewise exponential R-D model and updating R-D model (θ_i (k), R_i(k), and $D_i(R_i(k); \theta_i (k))$ based on inclusion of each (run-length) pair), and if $|\partial D_i / \partial R_i|$ is less than λor if $|\partial D_i / \partial R_i|$ is a first ratio that is not less than λ, read the k-th (run, length) pair into a base layer (Ye: Col.7, line 15-20),

otherwise if $|\partial D_i / \partial R_i|$ is greater than λ, read the k-th (run, length) pair into an enhancement layer (Ye: Col.7, line 21-22), where λ is determined by decoding side information (Ye: λ should be quantized for transmission over the channel, col.7, line 38-40).

Regarding **claim 14**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses further comprising the step of transmitting the base (base layer, fig.1) and enhancement layers (enhancement layer, Fig.1) over different transmission channels (plurality of channels, col.4, line 56).

Regarding **claim 15**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein scalable video decoder (scalable video coding, col.1, line 16) is MPEG-4 Decoder (MPEG 4, col.1, line 29).

Regarding **claim 16**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein scalable video decoder (scalable video coding, col.1, line 16) is H.263 Decoder (H.263, col.2, line 23).

Regarding **claim 17**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein scalable video decoder (scalable video coding, col.1, line 16) is MPEG-2 Encoder (MPEG 2, col.1, line 29).

Regarding **claim 18**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein scalable video decoder is a video decoder which uses DCT transform (Discrete Cosine Transform, col.2, line 10) and entropy coding (entropy coding, col.5, line 29-30).

Regarding **claim 19**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein scalable video decoder is realized by a merger in front of a single layer video decoder selected from the group consisting of an MPEG2, MPEG4, and H.26L decoder (merger in front of a single layer video decoder selected from the group consisting of an MPEG2, MPEG4, and H.26L decoder , col.10, line 49-52).

Regarding **claim 20**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses further comprising the step of receiving λ as side information to a decoder (λ should be quantized for transmission over the channel, col.7, line 38-40).

Regarding **claim 21**, Ye and Zhang disclose everything claimed as applied above (see claim 20). In addition, Ye discloses wherein the side information is sent only once in a flame header for the video frame (only once at the video frame header, col.7, line 52-56).

Regarding **claim 22**, Ye and Zhang disclose everything claimed as applied above (see claim 20). In addition, Ye discloses wherein the side information is copied for each slice header or video packet header to increase robustness (λ may be sent at the slice or video packet level to combat frame header loss, col.7, line 57-60).

Regarding **claim 23**, Ye and Zhang disclose everything claimed as applied above (see claim 13). In addition, Ye discloses wherein λ is determined to meet a rate budge for a transmission channel for the base layer.

(λ is determined by the standard bisection search so that the rate constraint is satisfied, col.6, line 23-24).

Regarding **claim 24,** the claimed invention is an apparatus claim corresponding to the method claim 13. Claim 13 has all the features of claim 24 except memory and processor.

However, Ye further discloses a memory (memory 20, Fig.4) which stores computer-executable process steps; and a processor (processor 38, Fig.4) which executes the process steps stored in the memory

Regarding **claim 25**, Ye and Zhang disclose everything claimed as applied above (see claim 24). In addition, Ye discloses wherein λ is received by the decoder as side information-associated with the video frame and the side information is sent only once in a frame header for the video frame (λ overhead need to be sent only once at the video frame header, col.7, line 52-56).

Regarding **claim 26**, Ye and Zhang disclose everything claimed as applied above (see claim 24). In addition, Ye discloses wherein λ is determined to meet a rate budge for a transmission channel for the base layer.

(λ is determined by the standard bisection search so that the rate constraint is satisfied, col.6, line 23-24).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zhang (US 2003/0,058,931) discloses Transcoder for Scalable Multi-Layer Constant Quality.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HEE-YONG KIM/
Examiner, Art Unit 2621

/Andy S. Rao/
Primary Examiner, Art Unit 2621
July 23, 2010